

#### ABSTRACT OF THE DISCLOSURE

The main subject of the present invention is a semiconductor device with a semiconductor element bonded on a circuit substrate by a bump comprising a solder alloy. Here, the solder alloy is an Sn-Ag-based alloy having a 90 (wt%) or more Sn content, a 0.01 or less (cph/cm<sup>2</sup>)  $\alpha$  ray amount in Sn, and a 1.5 (wt%) to 2.8 (wt%) Ag content. Accordingly, a solder alloy capable of preventing generation of a needle-like projection generated in a solder alloy at the time of bonding a semiconductor element on a circuit substrate for coping with frequent generation of a soft error accompanying the fine pitch, in executing the flip-chip bonding in a Pb-free solder alloy mainly containing Sn, with a long fatigue life without causing deterioration of the insulation resistance, and without generation of a soft error by  $\alpha$  rays, and a semiconductor device using the same are realized.